UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	Docket Nos. 52-025-LA-2; 52-026-LA-2
SOUTHERN NUCLEAR OPERATING CO.	)	
License Amendment Application for Combined Licenses NPF-91 and NPF-92 Vogtle Electric Generating Plant Units 3 and 4	)	

SOUTHERN NUCLEAR OPERATING COMPANY'S ANSWER OPPOSING PETITION TO INTERVENE AND REQUEST FOR HEARING

In accordance with 10 CFR § 2.309(i), Southern Nuclear Operating Company, Inc. ("SNC") hereby files its Answer to the "Petition for Leave to Intervene and Request for Hearing by the Blue Ridge Environmental Defense League and its Chapter Concerned Citizens of Shell Bluff[1] Regarding [SNC's] request for a License Amendment and Exemption for Containment Hydrogen Igniter Changes, LAR-15-003" (the "Petition"). The Petition responds to the Nuclear Regulatory Commission's ("NRC") March 2, 2016 notice of an opportunity to request a hearing[2] regarding SNC's February 6, 2015 License Amendment Request for the Vogtle Electric Generating Plant ("VEGP") Units 3 and 4 Combined Licenses ("COLs").[3] Petitioner has neither proffered an admissible contention nor demonstrated standing. Therefore, pursuant to 10 CFR § 2.309, the Petition should be dismissed.

[1] Referred to herein as "BREDL" or "Petitioner."

[2] Vogtle Electric Generating Plant, Units 3 and 4: License Amendment Application; Opportunity to Comment, Request a Hearing, and Petition for Leave to Intervene, 81 Fed. Reg. 10,920 (Mar. 2, 2016).

[3] ND-15-0280, Letter from B. Whitley to NRC Control Desk, Vogtle Electric Generating Plant Units 3 and 4 Request for License Amendment and Exemption: Containment Hydrogen Igniter Changes (LAR-15-003) (Feb. 6, 2015) (ADAMS Accession No. ML15037A715) (hereafter "LAR-15-003" or "LAR").

I. BACKGROUND

On February 10, 2012, the NRC issued COLs NPF-91 and NPF-92 to SNC for the construction and operation of VEGP Units 3 and 4. The VEGP COLs incorporate by reference 10 CFR Part 52, Appendix D, the Design Certification Rule for the AP1000 Design. The AP1000 Design Certification Document ("DCD"), the relevant portions of which are incorporated by reference into the VEGP Units 3 and 4 Updated Final Safety Analysis Report ("UFSAR"), includes a hydrogen ignition system—a non-safety related system designed to mitigate beyond-design-basis accidents—which includes 64 hydrogen igniters. The igniters are distributed throughout containment based on igniter location criteria set forth in the DCD; these criteria are based on Westinghouse's analysis of hydrogen behavior in the AP1000 containment during certain severe accident scenarios. In certifying the AP1000 design, the NRC reviewed and approved the hydrogen igniter location criteria and the underlying hydrogen analysis.

On February 6, 2015, pursuant to 10 CFR § 52.98(c) and in accordance with 10 CFR § 50.90, SNC submitted LAR-15-003 to modify the design of the hydrogen ignition subsystem by adding two hydrogen igniters above the In-Containment Refueling Water Storage Tank ("IRWST") roof vents to ensure that any hydrogen exiting the IRWST through the roof vents in a severe accident scenario would be burned off as close to the source as possible.[4] The igniters are consistent with the igniter location criteria in the DCD and do not affect the hydrogen analysis underlying those criteria.[5]

[4] LAR-15-003, Encl. 1, at 4. The LAR also proposes to clarify that control of the hydrogen igniters is through the Plant Control System in lieu of the Protection and Safety Monitoring System and to make consistency changes to UFSAR language describing the minimum surface temperature of hydrogen igniters and the location of an existing hydrogen igniter. Because the proposed changes require a departure from Tier 1 information in the AP1000 DCD, SNC also requested an exemption from the requirements of the generic DCD, pursuant to 10 CFR § 52.63(b)(1). The Petition does not challenge the exemption, the LAR's clarification regarding the Plant Control System, or the minimum surface temperature of hydrogen igniters; therefore, these issues are not discussed herein.

[5] LAR-15-003, Encl. 1, at 12.

The two Contentions in the Petition boil down to attacks on the AP1000 DCD analysis underlying the addition of the two new igniters at the IRWST roof vents. Contention One asserts that the LAR's proposed addition of new igniters is not supported by an adequate evaluation of hydrogen behavior in the AP1000 containment. Contention Two is a more specific variation of Contention One, asserting that the analysis of hydrogen behavior in the AP1000 containment suffers from five specific defects. Petitioner's arguments relating to the use of hydrogen igniters and the behavior of hydrogen inside containment directly challenge approved AP1000 DCD information that was considered and resolved in the AP1000 design certification rulemaking. Accordingly, the arguments are beyond the scope of this proceeding. Additionally, the Petition relies on unsupported comparisons between the AP1000 containment and hydrogen control design and the Fukushima events, failing to supply the requisite support or show a genuine dispute with LAR-15-003. Finally, the Petition fails to identify or discuss the regulatory requirements applicable to LAR-15-003 or contest that those requirements are met and, therefore, does not raise a relevant legal or factual dispute with the LAR. Because both Contentions challenge the AP1000 design certification rulemaking and NRC regulations, seek to reopen Fukushima issues that have been resolved, fail to supply the requisite degree of support, and do not directly contest the relevant conclusions in the LAR, both Contentions must be dismissed.

II. <u>APPLICABLE LAW</u>

The following subsections provide background on the requirements applicable to the NRC's review of LAR-15-003 and the requirements for contention admissibility and standing.

A. Standard for Issuance of LAR-15-003

The NRC reviews a license amendment request using the same legal standards that governed initial issuance of the license, which in this case, means that NRC's review of the LAR

is governed by 10 CFR § 50.44(c) and General Design Criteria (“GDC”) 41.[6] Section 50.44, “Combustible gas control for nuclear power reactors” provides the applicable requirements for controlling hydrogen generated following a severe beyond-design-basis loss-of-coolant accident (“LOCA”).[7] Pursuant to § 50.44(c), new reactors, including VEGP Unit 3 and 4, must (1) maintain a mixed atmosphere (i.e., keep concentrations of combustible gasses below a level that could support a combustion or detonation that could cause a loss of containment integrity); (2) limit hydrogen concentrations in containment following a postulated beyond-design-basis LOCA to less than 10 percent by volume; (3) maintain component functionality in the event that hydrogen is burned off inside containment; (4) monitor hydrogen concentrations in containment; and (5) demonstrate containment structural integrity will be maintained in the event of a significant beyond-design-basis LOCA. Reactor designs must also meet GDC 41, which requires systems to control the concentration of hydrogen in containment following postulated accidents such that containment integrity is maintained.[8]

Because the performance criteria for hydrogen control systems will vary by containment design, the NRC conducts design-specific reviews to evaluate compliance with 10 CFR § 50.44(c) and GDC 41.[9] The sections of the VEGP Units 3 and 4 UFSAR that describe the hydrogen control system are incorporated by reference from the AP1000 DCD.[10] NRC

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[6] *See* 10 CFR § 50.92(a); *Entergy Nuclear Ops., Inc.* (Palisades Nuclear Plant), CLI-15-22, 82 NRC __, slip op. at 10 (Nov. 9, 2015).

[7] Hydrogen control systems are non-safety related, meaning they are not relied on to prevent or mitigate a design basis accident. *See* Combustible Gas Control in Containment, Final Rule, 68 Fed. Reg. 54,123, at 54,124–125 (Sept. 16, 2003) (eliminating the requirement for control of design-basis LOCA hydrogen releases due to the lack of risk significance of such releases).

[8] 10 CFR Part 50, Appendix A, GDC 41.

[9] *See* Reg. Guide 1.7, Rev. 3, at 4 (Mar. 2007); NUREG-0800, Section 6.2.5, Rev. 3, at 4 (Mar. 2007).

[10] *See* NUREG-2124, Final Safety Evaluation Report for Combined Licenses for Vogtle Electric Generating Plant, Units 3 and 4, Section 6.2.2 (Aug. 10, 2011).

conducted its review for the AP1000 hydrogen control system during the AP1000 design certification and design certification amendment proceedings.[11]

In accordance with 10 CFR Part 52, Appendix D, and § 52.63(a), information contained in Tier 1 and Tier 2 of the AP1000 DCD is not subject to reopening or challenge in a proceeding for an amendment to a COL. In particular, Part 52, Appendix D, Section VI states:

> The Commission has determined that the structures, systems, components, and design features of the AP1000 design comply with … the applicable regulations [in 10 CFR parts 20, 50, 73, and 100]; and therefore, provide adequate protection to the health and safety of the public. A conclusion that a matter is resolved includes the finding that additional or alternative structures, systems, components, design features, design criteria, testing, analyses, acceptance criteria, or justifications are not necessary for the AP1000 design.
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> The Commission considers the following matters resolved within the meaning of 10 CFR 52.63(a)(5) in subsequent proceedings for … amendment of a COL …: All nuclear safety issues…associated with the information in the FSER and Supplement Nos. 1 and 2, Tier 1, Tier 2 …, and the rulemaking records for initial certification and Amendment 1 of the AP1000 design . . . .

In compliance with Part 52, Appendix D, with respect to DCD information not being changed by LAR-15-003, NRC may not require (a) additional or alternative structures, systems, components, or design features not discussed in the generic DCD or (b) additional or alternative design criteria, testing, analyses, acceptance criteria, or justification for structures, systems, components, or design features discussed in the generic DCD.[12]

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[11] *See* NUREG-1793, Final Safety Evaluation Report Related to Certification of the AP1000 Standard Design, Initial Report, Section 6.2.5 (Sept. 2004); NUREG-1793, Supp. 2, Section 6.2.5 (Sept. 2011). Because the AP1000 hydrogen control system did not substantially change between the original design certification and the design certification amendment, the Safety Evaluation Report ("SER") supporting the initial AP1000 design certification contains the bulk of staff's analysis.

[12] 10 CFR Part 52, Appendix D, Section VI.D.2 and 3; *Nuclear Innovation North America* (South Texas Project Units 3 & 4), LBP-11-07, 73 NRC 254, 274 (2011) ("10 C.F.R. § 52.63(a)(5) . . . affords finality to those matters resolved in connection with a design certification.").

B. Standard Applicable to BREDL's Hearing Request

A petitioner must propose at least one contention that meets the admissibility requirements in 10 CFR § 2.309(f)(1).[13] Each contention must: (i) provide a specific statement of the legal or factual issue sought to be raised; (ii) provide a brief explanation of the basis for the contention; (iii) demonstrate that the issue raised is within the scope of the proceeding; (iv) demonstrate that the issue raised is material to the findings the NRC must make to support the action that is involved in the proceeding; (v) provide a concise statement of the alleged facts or expert opinions, including references to specific sources and documents that support the petitioner's position and upon which the petitioner intends to rely; and (vi) provide sufficient information to show that a genuine dispute exists with regard to a material issue of law or fact.[14] A contention that fails to comply with even one of the 10 CFR § 2.309(f)(1) criteria is inadmissible.[15] Challenges to the existing licensing basis which are not proposed to be modified cannot form the basis for an admissible contention in a license amendment proceeding.[16] Likewise, challenges to a certified design may not be raised in proceedings on a COL that incorporates the relevant portions of the certified design's DCD, as explained above.[17]

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[13] *See* 10 CFR § 2.309(a).

[14] *See* 10 CFR § 2.309(f)(1)(i)–(vi).

[15] *See, e.g.*, *FirstEnergy Nuclear Operating Co.* (Davis-Besse Nuclear Power Station, Unit 1), CLI-12-08, 75 NRC 393, 395–96 (2012); *see also* Changes to Adjudicatory Process, 69 Fed. Reg. 2182, 2221 (Jan. 14, 2004).

[16] *See Dominion Nuclear Conn., Inc.* (Millstone Nuclear Power Station, Unit 3), LBP-08-9, 67 NRC 421, 437–38 (2008).

[17] *See* 10 CFR §§ 52.63, 2.335; 10 CFR Part 52, Appendix D, Section VI.B; *Progress Energy Carolinas, Inc.* (Shearon Harris Nuclear Power Plant, Units 2 & 3), CLI-10-09, 71 NRC 245, 260 (2010) ("To the extent that [Petitioner] challenges the AP1000 design certified in Part 52, Appendix D, it is an impermissible challenge to NRC regulations . . . ."); *Southern Nuclear Operating Co.* (Early Site Permit for Vogtle ESP Site), LBP-07-03, 65 NRC 237, 252 (2007).

In addition to an admissible contention, BREDL must demonstrate standing per § 2.309(d)(1).[18] In proceedings for "construction permits, operating licenses, or significant amendments thereto," the "proximity presumption" allows petitioners to establish standing by showing geographic proximity to a reactor.[19] This presumption is limited to proceedings in which the petitioner establishes an "obvious potential for offsite consequences."[20] In all other proceedings, petitioners must demonstrate standing using the traditional analysis.[21] Under the traditional standing analysis, in license amendment proceedings petitioners must construct a "plausible chain of causation" explaining how the amendment would result in a "distinct new harm or threat" and cannot rely on injuries attributable to the facility itself or to aspects of the facility that are not implicated by the amendment.[22]

III. BOTH CONTENTIONS SEEK TO LITIGATE ISSUES BEYOND THE SCOPE OF THIS PROCEEDING

Instead of mounting a challenge to the LAR itself, the Petition effectively attacks (1) the use of hydrogen igniters in general, (2) the AP1000 containment design, (3) Westinghouse's analysis of hydrogen behavior in the AP1000 containment, (4) Westinghouse's criteria for determining where igniters should be located in containment, and (5) the NRC's decision not to modify hydrogen control regulations or require design changes to the AP1000 following the

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[18] 10 CFR § 2.309(d)(1); *Calvert Cliffs 3 Nuclear Project, LLC* (Calvert Cliffs Nuclear Power Plant, Unit 3), CLI-09-20, 70 NRC 911, 915 (2009).

[19] *Fla. Power & Light Co.* (St. Lucie, Units 1 & 2), CLI-89-21, 30 NRC 325, 329 (1989) (citation omitted); *Exelon Generation Co., LLC* (Peach Bottom Atomic Power Station, Units 2 & 3), CLI-05-26, 62 NRC 577, 580–81 (2005).

[20] *See St. Lucie*, CLI-89-21, 30 NRC at 329–30; *Peach Bottom*, CLI-05-26, 62 NRC at 580–81.

[21] In order to demonstrate standing using the traditional analysis, a petitioner must show: (1) a concrete and particularized injury that is (2) fairly traceable to the challenged action and (3) likely to be redressed by a favorable decision. *See Yankee Atomic Elec. Co.* (Yankee Nuclear Power Station), CLI-96-1, 43 NRC 1, 6 (1996).

[22] *Commonwealth Edison Co.* (Zion Nuclear Power Station, Units 1 & 2), CLI-99-04, 49 NRC 185, 192 (1999) (quoting *Commonwealth Edison Co.* (Zion Nuclear Power Station, Units 1 & 2), LBP-98-27, 48 NRC 271, 277 (1998)); *Fla. Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 3 & 4), LBP-08-18, 68 NRC 533, 541 (2008).

Fukushima Daiichi accident. All of the issues raised in both Contentions have been resolved as part of the AP1000 certification, issuance of the VEGP COLs, the Commission's § 50.44(c) rulemaking, or the Commission's resolution of the Fukushima Near-Term Task Force's recommendations. Because both Contentions seek to litigate issues that are afforded finality and are beyond the scope of this proceeding, both must be dismissed for failure to satisfy § 2.309(f)(1)(iii).

A. Challenges to the Analysis Underlying the LAR Are De-Facto Challenges to the AP1000 DCD and Are Beyond the Scope of this Proceeding

Petitioner's primary objection to the LAR—in both Contentions—is based on the Petitioner's assertion that an igniter in close proximity to hydrogen in containment creates an "extremely dangerous situation" due to SNC's failure to properly evaluate the effects of the two new igniters or the behavior of hydrogen in the AP1000 containment.[23] In reality, Petitioner's arguments are aimed at the rulemaking certifying the AP1000 design. During design certification, the NRC reviewed and approved the DCD's criteria for locating igniters in containment and the underlying hydrogen analysis. As stated in the LAR, the two IRWST roof vent igniters are consistent with the igniter location criteria in the DCD and do not change the underlying hydrogen analysis.[24] Neither the Petition nor the Declaration of Arnold Gundersen ("Gundersen Declaration" or "Declaration") contest this fact. The Petition's challenges to the analysis supporting the LAR, therefore, are challenges to approved portions of the AP1000 DCD that are not changed by the LAR and are afforded finality pursuant to 10 CFR § 52.63(a) and Part 52, Appendix D.

[23] Petition, at 7–8, 11–12.

[24] LAR-15-003, Encl. 1, at 4, 11–12.

The following discussion explains the applicable DCD content, how the relevant issues were resolved during design certification, and how approved DCD content is applied in the LAR.

1. NRC Approved the DCD Criteria for Locating Hydrogen Igniters During AP1000 Design Certification

The hydrogen ignition subsystem, described in DCD Section 6.2.4.2.3 (Exhibit 1), is designed to burn off hydrogen at low concentrations to prevent hydrogen buildup in containment.[25] The location of igniters throughout containment is based on "evaluation of hydrogen transport in the containment and the hydrogen combustion characteristics."[26] DCD Section 19.41 describes the AP1000 hydrogen mixing and combustion analysis conducted as part of Westinghouse's probabilistic risk assessment ("PRA"), including the expected behavior of hydrogen in the AP1000 containment during severe accident scenarios and the effectiveness of the hydrogen igniter subsystem to manage hydrogen concentrations.[27] This analysis informs the DCD criteria for locating igniters throughout containment—set forth in DCD Tier 2, Table 6.2.4-6, Sheet 1 (Exhibit 2 at 1)—which in turn determined the location of each igniter. The DCD lists igniters in 64 locations throughout containment; each igniter is located in accordance with the criteria in Table 6.2.4-6, Sheet 1.[28]

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[25] DCD Tier 2, Section 6.2.4.2.3, at p.6.2-42 (Ex. 1). The AP1000 hydrogen control system also consists of the hydrogen concentration monitoring subsystem and hydrogen recombination subsystem. *See* DCD Tier 2, Section 6.2.4.2. The LAR does not propose any changes to the hydrogen concentration monitoring or hydrogen recombination subsystems.

[26] DCD Tier 2, Section 6.2.4.2.3, at p.6.2-42 (Ex. 1).

[27] *See* DCD Tier 2, Section 19.41.12 (summarizing the conclusion of the hydrogen analysis); *see also id.* Section 19.41.2 (describing the controlling phenomena for the hydrogen analysis); *id.* Section 19.41.5 (describing analysis of hydrogen igniters and explaining that "[t]he igniter system maintains the global uniform hydrogen concentration in the containment at or below lower flammability limits").

[28] DCD Tier 2, Table 6.2.4-6, Sheets 2 and 3 (Ex. 2 at 2–3) explain the location of each igniter and describe hydrogen behavior in various containment areas. DCD Tier 2, Table 6.2.4-7 lists each igniter. (Ex. 2 at 4). The number of igniters and their location are also reflected in Tier 1 material. *See* DCD Tier 1, Tables 2.2.3-6, 2.3.9-2, 2.3.9-3, and 3.7.1. Because the addition of two new igniters proposed by LAR-15-003 would require changes to Tier 1 material, the change requires NRC approval pursuant to 10 CFR Part 52, Appendix D, VIII.B.5.a.

The igniter location criteria in the DCD include the following requirements relevant to igniters at IRWST outlet vents:[29]

- "A sufficient number of igniters are placed in the major transport paths (including dominant natural circulation pathways) of hydrogen so that hydrogen can be burned continuously close to the release point. This prevents hydrogen from preferentially accumulating in a certain region of the containment."

- "Igniters (minimum of 2) are located in major regions or compartments where hydrogen may be released, through which it may flow, or where it may accumulate."

- "**In locations where the potential hydrogen release location can be defined, i.e., above the IRWST spargers, <u>at IRWST vents</u>, etc igniter coverage is provided as close to the source as feasible.**"[30]

In accordance with these criteria, four igniters are listed in Tier 1 and Tier 2 information as being located at some (but not all) IRWST outlet vents (specifically, wall vents locating along the containment wall).[31]

In certifying the AP1000 design, NRC reviewed and approved (1) Westinghouse's analysis of hydrogen behavior in containment; (2) the criteria in Table 6.2.4-6, Sheet 1 for locating igniters throughout containment; and (3) the implementation of those criteria to locate four igniters at IRWST outlet vents. NRC concluded that the AP1000 hydrogen control system met all requirements of 10 CFR § 50.44(c) and GDC 41.[32]

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[29] In a severe accident scenario, hydrogen may be released through the IRWST in the event that two or more automatic depressurization system ("ADS") stage 4 valves fail (absent failure of two or more ADS stage 4 valves, hydrogen would bypass the IRWST). The AP1000 PRA evaluated a scenario involving multiple failures of ADS stage 4 valves, with a frequency of 5.8×10^{-8} per reactor-year. LAR-15-003, Encl. 1, at 4.

[30] DCD Tier 2, Table 6.2.4-6, Sheet 1 (Ex. 2 at 1) (emphasis added).

[31] *See* DCD Tier 2, Table 6.2.4-6, Sheet 3 (Ex. 2 at 3); *id.* Table 6.2.4-7 (Ex. 2 at 4) (igniter nos. 35, 36, 37, 38). The DCD also locates four igniters inside the IRWST: two in close proximity to points where hydrogen would enter the IRWST, and two at IRWST inlet vents in the event that oxygen is drawn into a hydrogen-rich IRWST atmosphere. *See id.*, Table 6.2.4-7 (Ex. 2 at 4) (igniter nos. 9, 10, 15, 16).

[32] *See* NUREG-1793, Initial Report, Section 6.2.5.5, at p.6-71; *see also* NUREG-1793, Supp. 2, Section 6.2.5, at p.6-73 (Ex. 4 at 1).

In Chapter 19 of the initial AP1000 SER, staff described its review of the AP1000 PRA's hydrogen analysis and its own analyses conducted to evaluate the AP1000's ability to withstand beyond-design-basis accidents. These analyses evaluated the behavior of hydrogen in containment during a severe accident and the ability of the igniters to control hydrogen levels and protect containment structural integrity.[33] In SER Section 6.2.5.1 (Exhibit 3), staff described its review of the hydrogen ignition subsystem, the hydrogen location criteria in Table 6.2.4-6, potential hydrogen flows into and through the IRWST, and the use of igniters at IRWST outlet vents.[34] As a result of its review of the DCD and PRA, staff concluded as follows:

> On the basis of the staff's review and Westinghouse's implementation of the igniter location criteria as listed in DCD Tier 2, Table 6.2.4-6 the staff concludes that adequate igniter coverage has been provided. . . . The hydrogen ignition subsystem conforms to the requirements of 10 CFR 50.44 . . . .[35]

During review of the AP1000 design certification amendment, Westinghouse changed the location of certain hydrogen igniters, including the four igniters at the IRWST wall outlet

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[33] In the SER, Staff concluded that "hydrogen burn during postulated severe accidents does not challenge the integrity of the AP1000 containment"; "potential for hydrogen detonation is eliminated by design (i.e., limiting hydrogen concentration in the AP1000 containment to a maximum of 10 percent)"; and "[hydrogen combustion] do[es] not contribute to containment overpressure or overtemperature failure because . . . operation of the hydrogen igniter system produces peak hydrogen burn pressures well below [ASME Boiler Pressure Vessel Code Section III] Service Level C and eliminates the potential for deflagration-to-detonation transitions." NUREG-1793, Initial Report, Ch. 19, at pp.19-176, 19-184. ASME BPV Section III, Division 1, Subsubarticle NE-3220, Service Level C Limits provide an approved method for demonstrating the containment integrity requirement in 10 CFR § 50.44(c)(5) is met. *See* Reg. Guide 1.7, Rev. 3, C.5; NUREG-0800, Section 6.2.5, II.8.

[34] Staff noted with respect to potential hydrogen behavior in the IRWST:

> In the event that the IRWST is hydrogen rich and air is drawn into the IRWST, the mixture will become flammable. To provide for this type of recombination, the two inlet vents, on the [passive residual heat removal] side of the IRWST, have each been fitted with an igniter. Should the environment within the IRWST be inerted or otherwise not be ignited by the assemblies above the sparger, the hydrogen can be ignited as it exhausts from the IRWST at any of four vents fitted with igniter assemblies.

NUREG-1793, Initial Report, Section 6.2.5.1, at p.6-67 (Ex. 3 at 2); *see also* DCD Tier 2, Table 6.2.4-6, Sheet 3 (Ex. 2 at 3).

[35] NUREG-1793, Initial Report, Section 6.2.5.1, at p.6-68 (Ex. 3 at 3).

vents.[36] In Section 6.2.5 of the supplemental SER supporting the design certification amendment (Exhibit 4), staff concluded that the new igniter locations still satisfied the igniter location criteria in Table 6.2.4-6, Sheet 1 and, therefore, were consistent with the staff's approval of the hydrogen control system in the initial AP1000 SER:

> The changes to igniter locations . . . satisfy the igniter location criteria identified in DCD Table 6.2.4-6 (Sheet 1 of 3) that were used for the [design certification] review of the hydrogen igniter subsystem and referenced in the [initial] AP1000 SER. **Therefore, changes in the placement of the hydrogen igniters that are consistent with the criteria in Table 6.2.4-6 do not alter the design function of the igniters, have no effect on any analysis or analysis method, and do not affect the performance or controls of hydrogen control functions**.[37]

In other words, staff did not reopen review of the AP1000 hydrogen ignition subsystem or reevaluate the behavior of hydrogen inside AP1000 containment based on Westinghouse's proposal to change the location of igniters. Instead, staff concluded that, because the igniter locations were "consistent with the previously approved criteria [in Table 6.2.4-6]," Westinghouse's proposed changes were acceptable.[38] Following the AP1000 design certification amendment rulemaking in 2011, the igniter location criteria in the DCD are afforded finality pursuant to § 52.63(a) and 10 CFR Part 52, Appendix D, which treats as resolved DCD information "associated with the information in the FSER."

2. The Two Igniters Proposed by the LAR Are Consistent with the DCD Igniter Location Criteria

Like the changed locations proposed by Westinghouse during the design certification amendment, the addition of two new igniters proposed by LAR-15-003 follows the igniter

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[36] *See* APP-GW-GLN-003, Rev. 1, Hydrogen Igniter Locations, at 2–3 (Feb. 16, 2007) (ADAMS Accession No. ML070520284) (indicating redline changes to DCD Table 6.2.4-6, Sheet 3 and Table 6.2.4-6 elevations listed for the four IRWST wall vent igniters).

[37] NUREG-1793, Supp. 2, Section 6.2.5, at p.6-73 (Ex. 4 at 1) (emphasis added).

[38] NUREG-1793, Supp. 2, Section 6.2.5, at p.6-74 (Ex. 4 at 2).

location criteria in Table 6.2.4-6.[39] In fact, the change is being proposed to eliminate inconsistency between the current lists of igniters in DCD Tier 1 and Tier 2 (Tier 1 Table 2.3.9-2 and Tier 2 Tables 3.6.2-1 and 6.2.4-7) and the igniter location criteria in Table 6.2.4-6, Sheet 1—specifically, criterion bullet no. 9:[40]

> In locations where the potential hydrogen release location can be defined, i.e., above the IRWST spargers, at IRWST vents, etc igniter coverage is provided as close to the source as feasible. (emphasis added)

As explained above, the DCD and current UFSAR already list four igniters at IRWST wall outlet vents; however, the existing lists of igniters in the DCD do not include two igniters at the IRWST roof vents.[41] The LAR proposes to add two igniters that will be located immediately above the IRWST roof vents, to ensure that the lists of igniters in the VEGP Units 3 and 4 UFSAR include igniters in close proximity to all IRWST outlet vents, as required by the igniter location criteria in the DCD.

The LAR does not change the igniter location criteria in Table 6.2.4-6, the location of existing igniters, any other aspect of the AP1000 hydrogen control system, the AP1000 containment design impacting hydrogen production or transport, or the AP1000 analysis regarding hydrogen behavior in containment during a severe accident.[42] Rather, the LAR simply proposes to resolve an internal inconsistency in the DCD by adding the two IRWST roof vent

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[39] As explained in the LAR, "[t]he new hydrogen igniters are located in accordance with the placement criteria of UFSAR Table 6.2.4-6, *Igniter Location*, bullet 8 (that [igniters] be located as close to the exit of the IRWST vents as feasible)". LAR-15-003, Encl. 1, at 4. The language referenced in the LAR is actually from bullet 9 rather than bullet 8.

[40] *See* LAR-15-003, Encl. 1, at 12 ("[T]o ensure consistency is maintained with the placement criteria of UFSAR Table 6.2.4-6, two igniters are proposed to be added outside the IRWST near the exit of these roof vents.").

[41] The four existing igniters at the IRWST wall vents (which are located along the containment wall) and the four igniters inside the IRWST (see note 31 above) are not located for the purpose of controlling hydrogen exhausted from the IRWST roof vents. The closest igniters above the IRWST roof vents are located on the generator doghouse wall (in the upper containment compartment) thirty feet above the vents. *See* LAR-15-003, Encl. 1, at 11; DCD Tier 2, Table 6.2.4-7 (Ex. 2 at 4) (igniter nos. 39 and 48).

[42] *See* LAR-15-003, Encl. 1, at 12.

igniters that are required by Table 6.2.4-6 but are omitted from the corresponding Tier 1 and Tier 2 lists of hydrogen igniters. As explained in the LAR—and in NRC's supplemental AP1000 SER—changes to igniter placement that are consistent with the location criteria "do not alter the design function of the igniters, have no effect on any analysis or analysis method, and do not affect the performance or controls of hydrogen control functions."[43]

The LAR also discusses the applicable standards and concludes that both § 50.44(c) and GDC 41 are satisfied by virtue of the fact that the proposed new igniters are consistent with the AP1000 hydrogen ignition subsystem design in the existing licensing basis (i.e., the Table 6.2.4-6 igniter location criteria) which has been approved by the NRC to meet § 50.44(c) and GDC 41.[44] In other words, the LAR demonstrates compliance with applicable regulatory requirements by demonstrating that the IRWST roof vent igniters are consistent with the AP1000 hydrogen control system design that was certified and approved by the NRC in the AP1000 DCD and found by the NRC to satisfy § 50.44(c) and GDC 41.

3. Contentions One and Two Are De-Facto Challenges to Approved DCD Content

BREDL never challenges the LAR's conclusions that the IRWST roof vent igniters are consistent with the DCD igniter location criteria; that the new igniters "do not alter the design function of the igniters, have no effect on any analysis or analysis method, and do not affect the performance or controls of hydrogen control functions"; or that the applicable regulatory

[43] LAR-15-003, Encl. 1, at 12; NUREG-1793, Supp. 2, Section 6.2.5, at p.6-73 (Ex. 4 at 1).

[44] LAR-15-003, Encl. 1, at 15 ("The addition of hydrogen igniters is consistent with the hydrogen ignition subsystem design as certified and approved in the plant specific-DCD and presented in the COL, and assures compliance with [GDC 41 and 10 CFR § 50.44(c)]."). The LAR also addresses 10 CFR § 50.34(f)(2)(ix). The substantive requirements of § 50.34(f)(2)(ix) and § 50.44(c) are identical. The NRC imported the requirements of § 50.34(f)(2)(ix), without substantive change, to § 50.44(c) to consolidate the combustible gas control requirements applicable to new reactors. *See* Combustible Gas Control, 68 Fed. Reg. at 54,128. The LAR discusses § 50.34(f)(2)(ix) to maintain consistency with the VEGP Units 3 and 4 UFSAR; however, compliance with § 50.34(f)(2)(ix) is demonstrated by compliance with § 50.44(c), and so this Answer does not discuss § 50.34(f)(2)(ix) as an independent requirement.

requirements in § 50.44(c) and GDC 41 continue to be met. Instead, BREDL simply asserts that LAR-15-003 is not supported by a proper evaluation of hydrogen behavior in containment, and thus the new igniters potentially create some new risk that has not been assessed by Westinghouse, SNC, or the NRC.[45] Because BREDL does not make any argument that calls into question the LAR's conclusions that the new IRWST roof vent igniters are consistent with the AP1000 DCD igniter location criteria—and therefore are supported by the same analysis underlying the 64 igniters already listed in the DCD—all of BREDL's arguments related to the sufficiency of the analysis underlying the LAR are impermissible challenges to the underlying analysis for the Table 6.2.4-6 igniter location criteria. The igniter location criteria and hydrogen analysis were approved during certification of the AP1000 design and are not being changed by LAR-15-003; therefore, all of BREDL's arguments in relation thereto are beyond the scope of this proceeding and must be dismissed for failure to satisfy 10 CFR § 2.309(f)(1)(iii).

4. Contention Two Challenges Approved DCD Content and NRC Regulations

In addition to the general attempt to revisit the analysis conducted during the AP1000 design certification just discussed, Contention Two presents five alleged defects in the DCD's hydrogen analysis: (1) "the LAR assumes concentration of hydrogen is uniform throughout the AP1000 containment, including sub-compartments"; (2) "the Company hypothesizes that the only source of hydrogen is emitted from the reaction between zirconium and water"; (3) "other sources of hydrogen production are ignored"; (4) "radiolytic decomposition of water has been ignored as a source of both hydrogen and oxygen, and concrete degradation from contact with corium creates both hydrogen and oxygen, called the Molten Core Concrete Interaction

[45] The only specific threat identified by Gundersen is the "additional pressure that would be created by either a detonation or deflagration shock wave if one of the proposed igniters causes backflow into a sub-compartment", which, according to Gundersen, would make "gross containment failure . . . likely to occur." Declaration, at 11–12. As discussed below, this statement is wholly unsupported speculation.

(MCCI)"; and (5) SNC "ignores the possibility that the igniter can create a flame that blows back through the [IRWST] roof vents."[46] Each of these criticisms is aimed at the DCD hydrogen analysis or NRC regulatory requirements, both of which are beyond the scope of this proceeding.

The first alleged defect is aimed at the regulatory requirement in 10 CFR § 50.44(c)(2), that the combustible gas control system "limit hydrogen concentrations in containment during and following an accident that releases an equivalent amount of hydrogen as would be generated from a 100 percent fuel clad-coolant reaction, uniformly distributed, to less than 10 percent (by volume)".[47] BREDL challenges the regulatory requirement and the AP1000 hydrogen analysis. The 50.44(c)(2) "uniformly distributed" language does not mean that containment designs are supposed to assume uniform distribution of hydrogen for purposes of designing a hydrogen control system (including siting hydrogen igniters); rather, it means that compliance with the 10 percent limit is measured based on analytical results demonstrating uniform hydrogen distribution. Contrary to BREDL's assertion, the DCD does not assume uniform hydrogen distribution. Rather, DCD Section 19.41 contains a hydrogen mixing and combustion analysis that takes into account variations in hydrogen concentrations throughout containment, and the igniter location criteria in Table 6.2.4-6 were developed based on evaluation of hydrogen sources, transport, and accumulation and the resulting concentrations of hydrogen and oxygen levels throughout containment.[48] This analysis demonstrates (rather than "assuming") that the

[46] Petition, at 11–12; Declaration, at 7–8. The Gundersen Declaration also quotes a license condition found in Section D.12(g)(9) of the VEGP COLs (which requires SNC to perform a thermal lag assessment prior to fuel load using a specified EPRI methodology) and asserts that "it is impossible to perform a realistic thermal lag assessment" due to uncertainty regarding hydrogen behavior in the AP1000 containment. Declaration, at 14–15. The Petition does not refer to this statement in the Declaration and does not otherwise discuss this license condition. The license condition has nothing to do with the LAR and is not at issue in this proceeding.

[47] 10 CFR § 50.44(c)(2) (emphasis added).

[48] *See* DCD Tier 2, Section 19.41.1 ("global deflagration and potential detonation due to stratification of gases is considered"); DCD Tier 2, Section 6.2.4.2.3 (Ex. 1) ("igniters are placed in the major regions of the containment where hydrogen may be released, through which it may flow, or where it may accumulate.").

hydrogen control system maintains a uniform hydrogen concentration below the 10 percent regulatory threshold.[49] And the AP1000 SER concluded that the hydrogen ignition subsystem complies with 10 CFR § 50.44.[50]

The next three alleged defects all related to some supposed failure to consider additional sources of hydrogen beyond that generated by cladding-coolant reaction. Again, BREDL misunderstands both the relevant regulatory requirement and the AP1000 hydrogen analysis. Section 50.44(c) specifically requires that hydrogen control systems maintain less than 10 percent hydrogen concentrations for "an accident that releases an equivalent amount of hydrogen as would be generated from a 100 percent fuel clad-coolant reaction".[51] Prior iterations of the regulation required licensees to consider other sources of hydrogen production; however, NRC amended its rules based on its improved understanding of the risks associated with hydrogen production in the event of a severe accident.[52] As a result of staff's evaluation of expected hydrogen generation sources in a beyond-design-basis accident, staff has concluded that, for reactor designs like the AP1000, requiring control for the equivalent amount of hydrogen as would be generated by a 100 percent cladding oxidation reaction adequately accounts for all

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[49] *See* DCD Tier 2, Section 19.41.12 ("Analyses are performed to meet the requirements of 10 CFR 50.44. Igniter burning analyses with rapid hydrogen generation and 100-percent cladding reaction conclude that the igniter system maintains the global uniform hydrogen concentration in the containment at or below lower flammability limits.").

[50] NUREG-1793, Initial Report, Section 6.2.5.1, at p.6-68 (Ex. 3 at 3); *see also id.* ("The staff does not expect significant stratification within the AP1000 containment based on the containment-mixing evaluation (below) and the number and location of igniters provided for the AP1000 containment."); *id.*, Section 6.2.5.3 ("An analysis should be presented that demonstrates that excessive stratification of combustible gases will not occur within the containment or within a containment subcompartment. . . . This analysis is acceptable if it shows that combustible gases will not accumulate within a compartment or cubicle to a level that supports combustion or detonation which could cause loss of containment integrity. As discussed below, the applicant has done this for the AP1000.").

[51] *See* 10 CFR § 50.44(c)(2), (3), (5).

[52] *See* Licensing Requirements for Pending Construction Permit and Manufacturing License Applications, Final Rule, 47 Fed. Reg. 2286, 2302 (Jan. 15, 1982) (amending hydrogen control requirements for new reactors to require control of the equivalent amount of hydrogen that would be generated from a 100 percent cladding–water reaction).

potential sources of hydrogen in containment.[53] In accordance with § 50.44(c), the DCD used the 100 percent cladding oxidation requirement for purposes of designing the hydrogen ignition subsystem and the NRC evaluated the efficacy of the hydrogen control system against the 100 percent cladding oxidation scenario.[54] BREDL's challenge to LAR-15-003 with respect to the sources of hydrogen is a challenge demanding different or more stringent controls than those required by NRC regulations and approved in the AP1000 DCD, and is therefore inadmissible.[55]

The last alleged defect asserts that SNC "ignores the possibility that the igniter can create a flame that blows back through the [IRWST] roof vents . . . causing a serious detonation."[56] But, the SER particularly concludes that the "potential for hydrogen detonation <u>is eliminated</u> by design (i.e., limiting hydrogen concentration in the AP1000 containment to a maximum of 10 percent)."[57] The Petition is further contradicted by the DCD's and the SER's conclusions that igniters inside the IRWST[58] and at the IRWST outlet vents are an acceptable way to address hydrogen in the IRWST.

Not only do arguments presented in Contention Two amount to an improper challenge to the DCD's hydrogen analysis, each argument is either flatly contradicted by the DCD itself or is

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[53] *See* SECY-90-016, Evolutionary Light Water Reactor (LWR) Certification Issues and Their Relationship to Current Regulatory Requirements, at 10 (Jan. 12, 1990) (ADAMS Accession No. ML003707849); *see also* DCD Tier 2, Section 6.2.4 ("Although hydrogen production due to radiolysis and [MCCI] occurs, the cladding reaction with water dominates the production of hydrogen for this case.").

[54] *See* DCD Tier 2, Section 6.2.4.2.3, at p.6.2-42 (Ex. 1); NUREG-1793, Initial Report, Section 6.2.5, at p.6-66 (Ex. 3 at 1).

[55] *South Texas Project Nuclear Operating Co.* (South Texas Project Units 3 & 4), LBP-09-21, 70 NRC 581, 613–14 (2009) (finding a contention inadmissible because "Petitioners [were] seeking to require the Applicant to do more than the regulation requires"); *Southern Nuclear* (ESP), LBP-07-03, 65 NRC at 252.

[56] Petition, at 12.

[57] NUREG-1793, Initial Report, at 19-176 (emphasis added); *see also* note 33, *supra*.

[58] *See* notes 31 and 34, *supra*. The DCD locates four igniters inside the IRWST: two in close proximity to points where hydrogen would enter the IRWST, and two at IRWST inlet vents in the event that oxygen is drawn into a hydrogen-rich IRWST atmosphere. *See* DCD Tier 2, Table 6.2.4-6, Sheet 3 (Ex. 2 at 3); *id.*, Table 6.2.4-7 (Ex. 2 at 4) (igniter nos. 9, 10, 15, 16); *see also* NUREG-1793, Initial Report, Section 6.2.5.1, at p.6-67 (Ex. 3 at 2).

a challenge to an NRC regulatory requirement. Such challenges cannot form the basis of an admissible contention.[59] For all of the foregoing reasons, Contention Two fails to raise an argument relevant to this proceeding and thus fails meet the requirements of § 2.309(f)(1)(iii) and should be dismissed.

B. The Petition's Arguments Related to Fukushima Are Beyond the Scope of this Proceeding

With respect to the Petition's discussion of the Fukushima events, the Petition itself acknowledges that its arguments related to the Fukushima accident were considered by the Commission prior to the AP1000 design certification amendment rule and issuance of the VEGP Units 3 and 4 COLs—as evidenced by the Petition's citation to Chairman Jaczko's dissent to the Commission's order authorizing issuance of the COLs.[60] Information from the Fukushima accident was also considered by the Commission prior to the AP1000 design certification amendment rule. Accordingly, all of BREDL's arguments related to Fukushima have been resolved and are foreclosed here. Because the supporting bases and technical discussion underlying both Contentions raise issues that have been resolved by the Commission and affirmed by the U.S. Court of Appeals for the D.C. Circuit,[61] both Contention One and Two fail to comply with § 2.309(f)(1)(iii).

In the Commission's order authorizing issuance of the VEGP COLs, the Commission declined to impose additional license conditions (over Chairman Jaczko's dissent) on the VEGP

[59] 10 CFR § 2.335; *Dominion Nuclear Conn., Inc.* (Millstone Nuclear Power Station, Units 2 & 3), CLI-01-24, 54 NRC 349, 364 (2001) ("Petitioners 'may not demand an adjudicatory hearing to attack generic NRC requirements or regulations, or to express generalized grievances about NRC policies.'" (quoting *Duke Energy Corp.* (Oconee Nuclear Station, Units 1, 2, & 3), CLI-99-11, 49 NRC 328, 334 (1999))); *Southern Nuclear* (ESP), LBP-07-03, 65 NRC at 252.

[60] *See* Petition, at 7 (citing *Southern Nuclear Operating Co.* (VEGP, Units 3 & 4), CLI-12-02, 75 NRC 63, 123 (2012) (Chairman Jaczko, dissenting)).

[61] *See BREDL v. NRC*, 716 F.3d 183, 200 (D.C. Cir. 2013) (denying petitions for review of the AP1000 design certification amendment and the VEGP COLs).

Units 3 and 4 COLs in response to the Fukushima Daiichi accident, explaining that additional requirements, if any, resulting from the Fukushima Near-Term Task Force's findings would be implemented through the NRC's normal regulatory process.[62] The Task Force itself already found that the AP1000 has "many of the design features and attributes necessary to address the Task Force recommendations" and supported "completing [AP1000] design certification rulemaking activities without delay."[63] In the final AP1000 design certification amendment rule, the Commission explained that the only Task Force recommendations relevant to the AP1000 were Recommendation 2 (seismic and flooding protection), Recommendation 4 (mitigation of prolonged station blackout), and Recommendation 7 (spent fuel pool makeup capability)—not Recommendation 6 (review of hydrogen control in containment).[64] As the Declaration acknowledges, the Commission ultimately determined that "no changes to the AP1000 [design certification rule] are required at this time" to address the Task Force's findings.[65]

In addition to the Task Force's findings, the Commission considered numerous petitions urging that design certification and licensing proceedings be delayed pending further evaluation of the events of Fukushima, that the NRC overhaul its regulatory requirements, and that the NRC require design changes to pending design certifications and existing reactors. BREDL filed multiple petitions in the AP1000 design certification amendment proceeding and COL dockets,

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[62] *VEGP Units 3 & 4*, CLI-12-02, 75 NRC at 119–21.

[63] SECY-11-0093, Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident, 71–72 (July 12, 2011) (ADAMS Accession No. ML111861807) (hereafter "NTTF Report").

[64] *See* AP1000 Design Certification Amendment, Final Rule, 76 Fed. Reg. 82,079, 82,081 (Dec. 30, 2011); NTTF Report, at 71–72. Task Force Recommendation 6 stated: "The Task Force recommends, as part of the longer term review, that the NRC identify insights about hydrogen control and mitigation inside containment or in other buildings as additional information is revealed through further study of the Fukushima Dai-ichi accident." *Id.* at 69.

[65] AP1000 Final Rule, 76 Fed. Reg. at 82,081; *see* Declaration, at 13 ("[T]he Units 3 and 4 AP1000 atomic reactor currently under construction at Vogtle were approved without any design changes related to the meltdowns at Fukushima Daiichi.").

including VEGP Units 3 and 4.[66] Most notably, BREDL filed a late-filed contention in the VEGP COL dockets asserting, among other things, the need for changes to NRC regulations and reactor designs based on the events of Fukushima.[67] And BREDL filed a petition in the AP1000 design certification amendment rulemaking docket urging the Commission to require changes to the AP1000 containment design in light of the Fukushima events, including an (incorrect) attack on the AP1000's lack of hydrogen igniters.[68] The Commission rejected all of BREDL's

[66] *See, e.g.*, Emergency Petition to Suspend All Pending Reactor Licensing Decisions and Related Rulemaking Decisions Pending Investigation of Lessons Learned from Fukushima Daiichi Nuclear Power Station Accident, filed in multiple dockets (Apr. 4, 2011) (ADAMS Accession No. ML111040327), *denied by Union Elec. Co.* (Callaway Plant, Unit 2), CLI-11-05, 74 NRC 141 (2011); Motion to Reopen the Record and Admit Contention Regarding the Safety and Environmental Implications of the Nuclear Regulatory Commission Task Force Report on the Fukushima Dai-ichi Accident, Docket Nos. 52-025-COL, 52-026-COL (Aug. 11, 2011) (ADAMS Accession No. ML11223A481), *rejected by PPL Bell Bend, L.L.C.* (Bell Bend Nuclear Power Plant), LBP-11-27, 74 NRC 591 (2011), *aff'd by Luminant Generation Co. LLC* (Comanche Peak Nuclear Power Plant, Units 3 & 4), CLI-12-07, 75 NRC 379 (2012); Motion to Reinstate and Supplement the Basis for Fukushima Task Force Report Contention, Docket Nos. 52-025-COL, 52-026-COL (Oct. 28, 2011) (ADAMS Accession No. ML11301A359), *denied by Luminant Generation Co. LLC* (Comanche Peak Nuclear Power Plant, Units 3 and 4), LBP-11-36, 74 NRC 768 (2011); Motion to Stay the Effectiveness of the Combined License for Vogtle Electric Generating Plant Units 3 and 4 Pending Judicial Review, Docket Nos. 52-025-COL, 52-026-COL (Feb. 16, 2012) (ADAMS Accession No. ML12047A387); *denied by Southern Nuclear Op. Co.* (VEGP Units 3 & 4), CLI-12-11, 75 NRC 523 (2012).

[67] *See* Motion to Reopen the Record and Admit Contention Regarding the Safety and Environmental Implications of the Nuclear Regulatory Commission Task Force Report on the Fukushima Dai-ichi Accident, Docket Nos. 52-025-COL, 52-026-COL (Aug. 11, 2011) (ADAMS Accession No. ML11223A481). While the petition was styled as a NEPA contention, BREDL advocated for overhauls to NRC regulations and changes to current reactor design and designs pending certification. *See id.*, Contention Regarding NEPA Requirement to Address Safety and Environmental Implications of the Fukushima Task Force Report, at 4–8 (PDF pp.16–20); *see also id.* Declaration of Dr. Arjun Makhijani, at 3–8 (PDF pp.59–64) (at 6 (PDF p.62), Dr. Makhijani opines that, "[i]n view of the events leading to the hydrogen explosions in Units 1, 3, and 4 at Fukushima, the reliability of the existing hardened vent system in Mark I and Mark II reactors has been thrown into question.").

[68] *See* Petition to Suspend AP1000 Design Certification Rulemaking Pending Evaluation of Fukushima Accident Implications on Design and Operational Procedures and Request for Expedited Consideration, at 12–19 (Apr. 6, 2011) (ADAMS Accession No. ML11265A051) (hereafter "AP1000 Petition to Suspend") (listing specific AP1000 design features that require modification or further analysis); *see also* Comments of Louis Zeller on Behalf of BREDL, Opposing Proposed AP1000 Design Certification Amendment Rule, at 3 (May 10, 2011) (ADAMS Accession No. ML11132A011) (discussing the AP1000's "flawed design"). BREDL's petition challenged the AP1000 containment design and attacked "[t]he Staff's acceptance of the AP1000 containment, lack of hydrogen igniters, and lack of safety grade equipment throughout the reactor." AP1000 Petition to Suspend, at 18 (emphasis added). While the petition was mistaken in its assertion that the AP1000 did not include hydrogen igniters, it is noteworthy that BREDL appears to have advocated for the use of igniters in the AP1000 containment, contrary to the immediate Petition's attack on the use of igniters in the AP1000 containment.

petitions,[69] and on appeal the D.C. Circuit upheld the orders rejecting BREDL's and its co-petitioners' Fukushima contentions in the VEGP COL dockets and the AP1000 design certification amendment rule.[70] BREDL is foreclosed from recycling those challenges in this proceeding.[71]

It also bears noting that NRC staff has recently recommended closure of Task Force Recommendation 6, regarding review of hydrogen control in containment, without making any changes to current regulations. As explained in SECY-15-0137 and SECY-16-0041, "staff assessed potential enhancements beyond those already included for new plants licensed under 10 CFR Part 52 (e.g., hydrogen igniters for AP1000 design reactors . . .) and found that such measures would not likely be justified under the finality provisions established under 10 CFR Part 52", and "staff's analyses support the conclusion that additional capabilities for hydrogen control and mitigation . . . would not provide a substantial safety enhancement and therefore

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[69] *See* note 66, *supra*. The Commission treated "petitions" filed in the AP1000 rulemaking docket as comments, but ultimately declined to suspend, require design changes, or impose additional requirements on the AP1000 design. *See* AP1000 Final Rule, 76 Fed. Reg. at 82,081.

[70] *See BREDL*, 716 F.3d at 186–87; *see also id.* at 190–95 (summarizing the procedural history of BREDL's and its co-petitioners' challenges).

[71] In its order denying BREDL's petition for review of the VEGP COLs, the D.C. Circuit noted that the Commission considered the Fukushima events and affirmed the NRC's rejection of the asserted Fukushima-based contentions, stating, "Absent any evidence—or even allegation—linking the conditions at the Vogtle site itself to the Task Force recommendations, NRC appropriately applied the applicable contention-specificity regulations in declining to admit Petitioners' contentions." *BREDL*, 716 F.3d at 193, 199 (citing *City of Idaho Falls, Idaho v. FERC*, 629 F.3d 222, 228 (D.C. Cir. 2011)). This affirmance of the VEGP Units 3 and 4 COLs' issuance, and in particular of the Commission's treatment of Fukushima-related contentions, forecloses considerations in this proceeding of contentions that were or could have been raised in the COL proceedings. *See* 10 CFR § 52.98. "Under the doctrine of issue preclusion, binding effect is to be given to the first resolution of an issue. …When an issue of fact or law is actually litigated and determined by a valid and final judgment, and the determination is essential to the judgment, the determination is conclusive in a subsequent action between the parties, whether on the same or a different claim." *Con. Edison Co. v. Bodman*, 449 F.3d 1254, 1257–58 (D.C. Cir. 2009) (citations omitted).

Instead, BREDL must use the process in 10 CFR § 2.206 to address any such issues. *See Texas Utilities Elec. Co.* (Comanche Peak Steam Electric Station, Unit 2), CLI-93-04, 37 NRC 156, 160 (1993) ("[A]s we recently noted in rejecting another petition for late intervention in the Comanche Peak proceedings, the issuance of the full power license for Comanche Peak Unit 1 closed out the opportunity for a hearing on the Unit 1 operating license…. As we noted there, '[a]ny challenge to the Unit 1 license must take the form of a petition under the form of 10 C.F.R. § 2.206 for an order issued under 10 C.F.R. § 2.202.' Therefore, we deny CFUR's request insofar as it purports to address the Unit 1 proceeding." (citing and quoting *Texas Utilities Elec. Co.* (Comanche Peak Steam Electric Station, Units 1 & 2), CLI-92-12, 36 NRC 62, 67 (1992))).

additional regulatory actions are not warranted."[72] Where the Commission has chosen to address an issue generically, arguments related to that issue may not be litigated in individual licensing proceedings.[73]

Notably, allegations like BREDL's related to the AP1000 hydrogen analysis and the effectiveness of igniters at controlling hydrogen concentrations were raised in a 10 CFR § 2.206 enforcement petition filed in 2012.[74] The § 2.206 petition articulated similar concerns presented in BREDL's Petition—that the AP1000 hydrogen analysis was inadequate and the hydrogen ignition subsystem could cause a hydrogen detonation that would threaten containment.[75] In declining to take enforcement action, the Office of New Reactors explained that "the issues raised in these requests relate to the AP1000 design, which has already been the subject of NRC staff review and evaluation as part of the AP1000 design certification. Under 10 CFR Part 52, Appendix D, Section VI.B, the safety issues raised in [the 2.206 petition] are considered resolved."[76]

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72 SECY-15-0137, Proposed Plans for Resolving Open Fukushima Tier 2 and 3 Recommendations, Encl. 4, at 15 (Nov. 4, 2015) (ADAMS Accession No. ML15254A016), *approved by* SRM-SECY-15-0137 (Feb. 8, 2016) (ADAMS Accession No. ML16039A175); SECY-16-0041, Closure of Fukushima Tier 3 Recommendations Related to Containment Vents, Hydrogen Control, and Enhanced Instrumentation, at 4 (Mar. 31, 2016) (ADAMS Accession No. ML16049A088).

73 *See Oconee*, CLI-99-11, 49 NRC at 345 ("If petitioners are dissatisfied with our generic approach to the problem, their remedy lies in the rulemaking process, not in [an individual licensing action] adjudication.").

74 *See* 10 C.F.R. § 2.206 Request to Have the Licensee of Vogtle Electric Generating Plant Units 3 and 4 Conduct Safety Analyses of Severe Accident Scenarios in which the AP1000 Hydrogen Igniter System Would be Actuated (Either Due to Flawed Emergency Response Guidelines or Plant Operator Error) After a Detonable Concentration of Hydrogen Developed in Containment, (Feb. 28, 2012) (ADAMS Accession No. ML12061A218) (hereafter "2.206 Petition").

75 *See* 2.206 Petition, at 6.

76 Vogtle Units 3 & 4 – 2.206 Petition Closure Letter, at 2 (Apr. 30, 2013) (ADAMS Accession No. ML13105A308); *see also id.* Encl. 1, at 1 ("As part of the application for certification of the AP1000 design, Westinghouse submitted a report on the AP1000 probabilistic risk assessment (PRA). Chapter 41 of the PRA [described in Section 19.41 of the DCD] documented severe accident scenarios that involved hydrogen burning (deflagration) and exploding (detonation). . . . The staff reviewed the applicant's analyses; all issues related to hydrogen deflagration and detonation were resolved before certifying the AP1000 design. . . . Since the Vogtle COL application referenced the relevant portions of the AP1000 certified design without departure or exemption, the requests identified above are rejected because the issues have already been reviewed by the staff.").

Petitioner's arguments asking for AP1000 design changes and more stringent NRC regulations based on the events of Fukushima are foreclosed in this licensing proceeding. Both arguments are outside the scope of this proceeding and fail to satisfy § 2.309(f)(1)(iii).

IV. CONTENTIONS ONE AND TWO ARE NOT ADEQUATELY SUPPORTED AND DO NOT RAISE A GENUINE DISPUTE WITH THE LAR

In addition to BREDL's attempts to reopen issues the Commission has already resolved, the Petition and Declaration fail to include the support required by §2.309(f)(1)(v) or articulate a genuine dispute as required by §2.309(f)(1)(vi). "It is the obligation of a petitioner to present the factual information and expert opinions necessary to adequately support its contention. Failure to do so requires that the contention be rejected."[77] In order to provide the "specific factual or legal basis required by 10 C.F.R. § 2.309(f)(1)(v)," BREDL must provide "reasonably specific sources of information to support the contention."[78] The contention should not just refer generally to documents or support, but should "provide analysis and supporting evidence as to why particular sections of those documents … provide a basis for the contention."[79] Where, as here, the Petition relies on alleged expert support, the support should "set[ ] out credentials showing that its author is an expert on" the relevant technical issues.[80] Moreover, "neither mere speculation nor bare or conclusory assertions, even by an expert, alleging that a matter should be considered will suffice to allow the admission of a proffered contention."[81]

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[77] *USEC Inc.* (American Centrifuge Plant), LBP-05-28, 62 NRC 585, 596 (2005).

[78] *Dominion Nuclear Conn., Inc.* (Millstone Nuclear Power Station, Units 2 & 3), LBP-04-15, 60 NRC 81, 91 (2004).

[79] *Fansteel, Inc.* (Muskogee, Oklahoma, Site), CLI-03-13, 58 NRC 195, 204 (2003).

[80] *Entergy Nuclear Generation Co.* (Pilgrim Nuclear Power Station), LBP-11-23, 74 NRC 287, 306 (2011).

[81] *Southern Nuclear* (ESP), LBP-07-03, 65 NRC at 253.

The only relevant information in either the Petition or the Declaration that is presented as factual or expert support relies on the events at Fukushima.[82] However, the Petition does not explain how the events at the Fukushima Daiichi plant and the behavior of hydrogen in the Fukushima units has any bearing on the AP1000 design or any relevant inquiry in this proceeding. While both Contentions seek to extrapolate the events of Fukushima to lend support to the Petitioner's allegations that there is something wrong with the AP1000 hydrogen control system (and, by further extension, the LAR), nowhere does the Petition or Gundersen Declaration make any attempt to compare the Fukushima GE Mark I BWR containment to the AP1000 passive PWR containment design. Nor does the Petition or Declaration explain how the events of Fukushima support the Petition's challenge to the two igniters above the IRWST roof vents or could inform the NRC's evaluation of this LAR (or even the AP1000 design generally).

The Petition and Declaration fail to make any connection between the alleged behavior of hydrogen in the Fukushima units and hydrogen behavior in the AP1000, which has a different containment design, different core cooling systems, different hydrogen control features, and different hydrogen sources and transport paths. The Commission determined that the AP1000 included design features that addressed all relevant Task Force recommendations, and neither the

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[82] The only other support provided for BREDL's arguments are (1) a 2010 presentation Gundersen gave to the Advisory Committee on Reactor Safeguards ("ACRS") during AP1000 design certification amendment proceedings, and accompanying report; and (2) materials from NASA on "Seven Axioms of Good Engineering." *See* Declaration, at 6, 11–12. The purpose of Gundersen's 2010 ACRS presentation was to convince them to withhold issuance of any COLs relying on the AP1000 design (including the then-pending VEGP Units 3 and 4 COLs) until alleged safety issues with the AP1000 containment design were resolved. *See* Transcript of ACRS AP1000 and VEGP Units 3 and 4 Subcommittee Meeting on June 25, 2010, at p.8, lines 21–24 (PDF p.252) (ADAMS Accession No. ML101930516). Gundersen's full report was submitted to the NRC in comments on the AP1000 proposed rule. *See* Rulemaking Comments of AP1000 Oversight Group et al. on Proposed AP1000 Design Certification Amendment Rule (Apr. 29, 2011) (ADAMS Accession No. ML11122A081) (Fairewinds report appears at PDF p.108). The presentation and report allege flaws in the AP1000 containment design and do not include any discussion related to hydrogen igniters or hydrogen control during severe accidents. The Petition's and Declaration's discussion of NASA's engineering principles is included without any explanation for how the materials relate to nuclear power plants, the AP1000 hydrogen control system, or the LAR. To supply the requisite support under § 2.309(f)(1)(v), a petitioner must identify specific portions of referenced materials and explain how those portions support its point. *See Pub. Svc. Co. of N.H.* (Seabrook Station, Units 1 & 2), CLI-89-03, 29 NRC 234, 240-41 (1989); *Oconee*, CLI-99-11, 49 NRC at 337.

Task Force nor the Commission concluded that the Task Force's Recommendation 6, related to review of hydrogen control systems, applied to the AP1000 design. Despite the clear NRC record concluding that the AP1000 design does not require modification with respect to hydrogen control based on lessons learned from the Fukushima events, the Petition blindly analogizes the Fukushima events to the AP1000 without any comparative discussion that might illustrate why Fukushima has any relevance in this proceeding. In effect, all of Petitioner's arguments are premised on the suggestion that it happened at Fukushima, so it could happen here.

This unsupported supposition does not meet the level of analytical rigor required by § 2.309(f)(1)(v).[83] And the fact that this supposition appears in the Gundersen Declaration does not automatically convert an inadequate analysis into an adequate one. The entirety of Gundersen's discussion regarding the relevance of Fukushima to the AP1000 design and the LAR is summed up in his conclusion that "[t]he AP1000 containment could react in a similar fashion if the proposed hydrogen igniters are installed."[84] Bare assertions, whether presented by experts or petitioners themselves, do not provide the technical support required to admit a valid contention.[85]

While the foregoing analytical shortcomings require the Board to dismiss both Contentions in their entirety, it is worth briefly addressing the only specific risk that Gundersen articulates with respect to the new igniters proposed by the LAR (as opposed to risks related to

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[83] *See Fansteel*, CLI-03-13, 58 NRC at 203 (noting that mere speculation and bare assertions alleging that a matter should be considered do not suffice to allow the admission of that contention); *Millstone*, LBP-08-09, 67 NRC at 446 ("[U]nsupported speculation . . . is insufficient to support an admissible contention and fails to meet 10 C.F.R. § 2.309(f)(1)(v).").

[84] Declaration, at 13.

[85] *Exelon Generating Company, LLC* (Early Site Permit for Clinton ESP Site) LBP-04-17, 60 NRC 229, 242 (2004) ("[N]either mere speculation nor bare or conclusory assertions, even by an expert, alleging that a matter should be considered will suffice to allow the admission of a proffered contention.").

hydrogen or hydrogen igniters in general). Gundersen hypothesizes that placing igniters above the IRWST roof vents "can create a flame that blows back through the IRWST roof vents . . . into the sub-compartment causing a serious detonation."[86] As his only support for this assertion, Gundersen states that "[b]ackflow did occur at Fukushima Daiichi", based on an excerpt from a web article which states that hydrogen "evidently backflowed" in Fukushima Daiichi unit 3 and the explosion in unit 4 "was apparently from hydrogen arising in unit 3 and reaching unit 4 by backflow".[87] Gundersen does not provide any context and does not even explain what phenomenon "backflow" is meant to refer to. More importantly, Gundersen provides no expert analysis of the AP1000 containment design, no explanation for how he alleges the igniters in question could cause "backflow," and no allegation that igniters are related to the "backflow" described at Fukushima.

The only technical support provided for both Contentions is baseless speculation that the events of Fukushima might repeat themselves at VEGP Units 3 and 4. The Petition fails to satisfy the requirements of § 2.309(f)(1)(v) and (vi) because it does not provide any explanation for how the supporting material relates to the proceeding at hand or provide adequate support to show a genuine dispute with LAR-15-003. Without the support of meaningful technical analysis and an explanation for how that analysis raises a genuine dispute with LAR-15-003, neither Contention meets the requirements of § 2.309(f)(1)(v) or (vi).

V. CONTENTIONS ONE AND TWO FAIL TO CONTEST ANY OF THE RELEVANT FACTUAL AND LEGAL CONCLUSIONS IN THE LAR

Neither Contention presented in the Petition satisfies 10 CFR § 2.309(f)(1)(i) and (iv), which require a contention to contain "a specific statement of the issue of law or fact to be raised

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[86] Declaration, at 8.

[87] *See* Declaration, at 8 (citing World Nuclear Association, Fukushima Accident, *available at* www.world-nuclear.org/information-library/safety-and-security/safety-of-plants/fukushima-accident.aspx).

or controverted" and "provide sufficient information to show that a genuine dispute exists with the applicant/licensee <u>on a material issue of law or fact</u>" including "references to specific portions of the application . . . that the petitioner disputes."[88] "An allegation that some aspect of a license application is 'inadequate' or 'unacceptable' does not give rise to a genuine dispute unless it is support[ed] by facts and a reasoned statement of why the application is unacceptable in some material respect."[89] A contention that "does not identify any regulatory requirement that [the] application fails to satisfy" or does not "raise specific challenges" to the relevant portions of the application does not meet the requirements of § 2.309(f)(1)(vi).[90]

Here, the Petition does not discuss the applicable legal standards, does not articulate how the LAR fails to satisfy a relevant legal standard, and does not contest the LAR's conclusion that all applicable regulatory standards have been met.[91] Accordingly, both Contentions fail to satisfy the requirements of § 2.309(f)(1)(i) and (iv) and must be dismissed.

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[88] 10 CFR § 2.309(f)(1)(i) and (vi) (emphasis added).

[89] *Nuclear Mgmt. Co., LLC* (Palisades Nuclear Plant), LBP-06-10, 63 NRC 314, 341 (2006); *See Detroit Edison Co.* (Fermi Nuclear Plant, Unit 3), LBP-10-9, 71 NRC 493, 526 (2010).

[90] *Florida Power & Light Co.* (Turkey Point Nuclear Generating Plant, Units 6 & 7), LBP-11-15, 73 NRC 629, 637 (2011); *see Detroit Edison Co.* (Fermi Nuclear Power Plant, Unit 3), LBP-12-12, 75 NRC 742, 761–62 (2012); *South Texas Project*, LBP-09-21, 70 NRC at 593. A contention does not raise a sufficiently detailed dispute where it only makes "general, nonspecific reference[s]" to the challenged application, fails to "challenge[] or even address[] the discussion or conclusions" in the application, or does not "explain how its supporting references might indicate an inadequacy". *Exelon Nuclear Texas Holdings, LLC* (Victoria Cty. Station Site), LBP-11-16, 73 NRC 645, 674 (2011).

[91] The Petition recites various legal standards that are generally applicable to the NRC regulatory process, but it does not explain how these legal standards are relevant to the outcome of this proceeding or why they are not met by the LAR. For example, Petitioner suggests the NRC should require SNC to remedy "unacceptable incompatibilities" between the LAR and the current licensing basis, but never explains how the LAR is inconsistent with the existing licensing basis and altogether ignores the LAR's statements that the new igniters are being proposed to ensure <u>consistency</u> in applying the igniter location criteria in the existing licensing basis. *See* Petition, at 9, 11. The Petition also states (incorrectly) that SNC did not perform licensing analyses to determine if a license amendment is needed, and the Petition asserts that the timing of SNC's submittal is somehow improper, without any mention of the NRC's ISG-011 process or any explanation for why the timing or reasons for requesting the LAR is relevant to the NRC's decision to grant or deny the request. *See id.* at 10, 13, 6–7; *see also* DC/COL-ISG-011, Interim Staff Guidance Finalizing Licensing-basis Information (Nov. 2009) (ADAMS Accession No. ML092890623) (discussing process whereby COL and design certification applicants establish a "freeze-point" for purposes of submitting new design information to the NRC for review).

The standard for issuance of LAR-15-003 is compliance with 10 CFR §50.44 and GDC 41. The LAR demonstrates compliance with § 50.44(c) and GDC 41 by demonstrating compliance with the igniter location criteria in Table 6.2.4-6, which has already been approved in the DCD rulemaking.[92] The Petition does not mention § 50.44(c) or GDC 41, does not allege that the LAR fails to meet these regulatory requirements, does not contest the LAR's conclusions that the new igniters are consistent with the DCD's igniter location criteria, and does not contest the LAR's conclusion that § 50.44(c) and GDC 41 are met. Much less does the Petition articulate any reason for why the placement of these two igniters is somehow inconsistent with the approved portions of the DCD, § 50.44(c), or GDC 41. In other words, the Petition never disputes the LAR on a relevant factual or legal point.[93] Because the Petition fails to contest any of the key conclusions in the LAR and fails to allege that the applicable legal standards are not met, it does not meet § 2.309(f)(1)(i) and (iv) and must be dismissed.

VI. PETITIONER DOES NOT SATISFY 10 CFR § 2.309(d) STANDING REQUIREMENTS

The Petition fails to satisfy § 2.309(d) and, therefore, should be denied. BREDL claims to have "proximity standing" on behalf of its members, but BREDL has not established that the new igniters proposed by the LAR present an obvious potential for offsite consequences. BREDL has also failed to construct a "plausible chain of causation" explaining how the addition of two more igniters would result in a "distinct new harm or threat" to its members required for a traditional standing analysis.[94] Alleged impacts from aspects of the VEGP Units 3 and 4 facility

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[92] *See* LAR-15-003, Encl. 1, at 12.

[93] *See Entergy Nuclear Vermont Yankee, LLC* (Vermont Yankee Nuclear Power Station), CLI-15-20, 82 NRC __, slip op. at 19, 27 (Oct. 1, 2015) (affirming the Atomic Safety and Licensing Board's decision to deny a petition to intervene because of the petitioner's failure to "raise a genuine dispute on a material issue regarding the proposed staffing reductions in the application"); *PPL Susquehanna, LLC* (Susquehanna Steam Electric Station, Units 1 & 2), LBP-07-10, 66 NRC 1 (2007).

[94] *Zion*, CLI-99-04, 49 NRC at 192 (quoting *Zion*, LBP-98-27, 48 NRC at 277).

that are not at issue in this proceeding (e.g., the potential for hydrogen production and the use of igniters) cannot form the basis for BREDL's standing.[95]

Petitioner does not explain how the addition of new igniters proposed by the LAR creates an obvious potential for offsite consequences. Petitioner's speculation that a detonation might occur is in direct conflict with the NRC's findings in the AP1000 SER and lacks any relevant support, as discussed more fully above.[96] Even if Petitioner's supposition were accepted on its face, the hypothetical result could only even become theoretically possible upon the occurrence of a beyond-design-basis accident scenario with a frequency of 5.8×10^{-8} per reactor-year.[97] Conclusory statements that are in direct conflict with the NRC's prior findings and that lump speculation on top of already extremely remote possibilities are insufficient to establish an obvious potential for offsite consequences.

VII. CONCLUSION

Neither Contention satisfies the requirements of § 2.309(f)(1). Both Contentions amount to a challenge of the AP1000 DCD and NRC regulations. The Contentions also fail to include the requisite support and do not raise a material dispute with the LAR. Additionally, the Petition fails to establish standing to challenge the LAR. Accordingly, the Petition must be denied.

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[95] "[A] petitioner seeking to intervene in a license amendment proceeding must assert an injury-in-fact associated with the challenged license amendment, not simply a general objection to the facility." *Zion*, CLI-99-04, 49 NRC at 188 (emphasis in original).

[96] Petitioners must identify a credible threat of obvious offsite consequence. *Energy Solutions, LLC Radioactive Waste Import/Export Licenses*, CLI-11-03, 73 NRC 613, 622 (2011); *see No Gas Pipeline v. FERC*, 756 F.3d 764, 767 (D.C. Cir. 2014) ("A 'conjectural or hypothetical' injury is not sufficient [to establish standing]." (citing *Lujan v. Defenders of Wildlife*, 504 U.S. 555, 560 (1992))); *Commonwealth Edison Co.* (Zion Nuclear Power Station, Units 1 & 2), CLI-00-05, 51 NRC 90, 98 (2000) ("[B]road and conclusory statements are insufficient to establish standing."). Licensing boards need not "uncritically accept such assertions, but may weigh those informational claims and exercise its judgment about whether the standing element at issue has been satisfied." *Strata Energy, Inc.* (Ross In Situ Recovery Uranium Project), LBP-12-3, 75 NRC 164, 177 (citing *PPL Bell Bend LLC* (Bell Bend Nuclear Power Plant), CLI-10-7, 71 NRC 133, 139 (2010)).

[97] The scenario in which hydrogen could enter the IRWST, and thus could potentially flow through the IRWST roof vents, has a frequency of 5.8×10^{-8} per reactor-year. LAR-15-003, Encl. 1, at 4.

Respectfully submitted,

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION
BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of:	)	Docket Nos. 52-025-LA-2; 52-026-LA-2
SOUTHERN NUCLEAR OPERATING CO.	)	
License Amendment Application for Combined Licenses NPF-91 and NPF-92 Vogtle Electric Generating Plant Units 3 and 4	)	May 27, 2016

CERTIFICATE OF SERVICE

Pursuant to 10 CFR § 2.305, I certify that on this date copies of the foregoing Answer Opposing Petition to Intervene and Request for Hearing were served upon the Electronic Information Exchange (the NRC's E-Filing System) in the above captioned matter.

Signed electronically by

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